They are, therefore, only regarded as and utilised as suitable reducing agents, in quite definite proportions in rare cases, and in small extent. One must much more often make use of other reduction materials, which ure at our disposal in large quantities.

Of these the first place is taken by carbon, which likewise easily combines with oxygen, and thereby produces heat. The amount of this is nevertheless considerably smaller than that from the substances before-mentioned, since 1 kilogramme () gives with carbon 8,0«K) calories on combustion to COa and 1,855 calories on combustion to 00.

One sees that carbon is not able by itself to remove oxygen from iron oxides and combine with it; it only then can be capable of doing this if it is enabled to increase its energy content. This can be brought about by the addition of boat which can be produced in different ways, amongst others, by means of combustion of further amounts of carbon, by means of gaseous oxygen externally, or internally, to the mixture of oxygen and carbon manipulated. But thereby the heat will be shared by tho oxides, and as in general the affinity of all substances for combination with oxygen increases with rise of temperature, with which tho difficulty of removal of the oxygon from its compounds is usually increased under such circumstances, the consequence of such influence on the energy content of the carbon does not without more ado admit of reduction. The results of practice, however, demonstrate that the individual substances in their relation to oxygen at high temperatures exhibit differences, and Ledebur first propounded that the law for the process of reduction with carbon is valid, that the combustibility of carbon with rising temperature.* </h>ic% more than that of remaining subxtantws. By employment of sufficiently high temperatures carbon then actually attains the capacity of removing oxygen from all remaining materials and thus making it a reducing agent which finally no oxide can longer withstand.

The reduction processes of practice are mostly of a very involved nature. Simple pure materials never attain mutual reaction, but those with various impurities, whereby the picture of the process is clouded, and is often rendered quite